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DEVELOPMENT OF A STANDARDIZED TELEPHONE INTERVIEW FOR THE MEASUREMENT OF LANGUAGE CHANGES IN YOUNG CHILDREN.

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Telephone interviews designed to elicit open-ended responses from disadvantaged kindergarten children were taped, analyzed, and scored to test the reliability of this interview technique in obtaining representative speech samples. To determine the effect of familiarity with telephones, one group of 12 children was provided with telephones in the classroom immediately following an initial interview; another group of 13 was given telephones following a second interview 3 months later; and a third group of eight children was interviewed once but given no additional exposure to the telephone. Finally, all three groups were interviewed at the end of an 8-month period. Results indicated that the telephone interview is a reliable technique for recording representative speech samples from young children and has application to longitudinal studies in which changes in verbal behavior can be analyzed in terms of vocabulary level, language structure, and articulation. No significant differences were found in a comparison of the three groups, suggesting that exposure to telephones in the classroom did not strongly influence the child's performance in the telephone interview. That this "exposure" to the telephone was essentially unstructured and that the children in the study were similar to each other should be considered. (DL)

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Development of a Standardized Telephone Interview for the Measurement of Language Changes in Young Children

FINAL REPORT
on
Project 5-8089
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1. Problem

The problem of obtaining representative speech samples from young children has been a major obstacle in the study of children's verbal behavior. This problem is especially crucial to the study of disadvantaged children who have been found to be particularly weak in the area of language development and who display a high proportion of reading and learning disabilities. Various attempts have been made to record children's spontaneous speech in natural play settings, from wiring each child with a hidden microphone, which presents its own technological difficulties, to face-to-face dialogues with adult examiners, which are often inhibitory and uncomfortable situations for children.

In an exploratory effort to solve this problem, Institute personnel devised and piloted still another technique for eliciting and recording children's speech. This technique, called the Telephone Interview, consisted of six questions of a general nature which were designed to allow as much freedom of verbalization as possible within the structure of an interview situation (see Appendix). During the interview, the child and the examiner sat in small telephone booths, 15 feet apart and facing away from one another. The questions were asked and answered over regular telephone instruments and the entire interview was taped.

This technique, used with kindergarten children during their free play periods in their classrooms, proved to be effective both in obtaining children's speech samples and in discriminating between the groups of kindergarten children tested, in terms of the imaginative use of language, the functional use of language, and the structure of the children's responses. In all instances, the experimental children who were enrolled in the Institute's enrichment program performed significantly better than their non-Institute controls.

The present study was designed to assess the usefulness of the telephone interview technique in tracking changes in the verbal behavior of individual children over time.

2. Objectives

The specific objectives of the study were:

a) to determine whether the samples of speech obtained with the telephone interview are reliable.

b) to determine whether the technique can be used in a longitudinal study to monitor change in verbal behavior of preschool children.

c) to develop a method for intensive analysis of transcriptions of the interviews so that changes in the language of children can be studied in terms of vocabulary level, language structure, and articulation.

d) to evaluate the effect upon the child's performance in the telephone interview of exposure to working telephones in the preschool classroom.

An additional future objective is to apply the findings of this study to a full-scale investigation of language development in children.

3. Procedure

a) General Design

During the last two weeks in October, 1964, two groups of children (Groups A and B) were introduced to the telephone apparatus in order to familiarize them with the testing situation. These 25 children were then given their first telephone interview (a revision of the form used in the pilot study-see Appendix). Immediately after the initial interviewing was completed, telephone systems, provided by the New York Bell Telephone Company, were installed in the classrooms of Group A. The teachers of these classes were provided with guidelines for introducing and using the telephones in the classrooms. The children in Group B had only toy telephones in their classrooms.

A second interview (a form with two alternate questions from the initial interview) was administered three months later (the third week in January, 1965) to the 25 children in Groups A and B. Following this testing, telephone systems were installed in the classrooms of Group B.

In December of 1964, eight children (Group C) were introduced to the telephone apparatus and were then given a first interview. These children had no additional exposure to working telephones in the classroom during the school year.

All 33 subjects participating in the study received a final interview in June, 1965, approximately eight months after the initial interviews for Groups A and B, and six months after the initial interview for Group C.

b) Population and Sample

The sample for this study consisted of children selected from five preschool classes in Harlem public schools. All the children were born in 1960 and were therefore eligible to enter kindergarten in September, 1965. The children were from families of lower socioeconomic status; the majority were Negro, and English was the main language spoken in their homes. The sample was balanced with respect to sex, and subjects were further selected on the basis of Stanford-Binet I.Q. scores--that is, an attempt was made to include equal numbers of children who scored above and below the class mean on the Stanford-Binet.

The final sample of 33 children was divided into three groups on the basis of the kind of intervening exposure to working telephones in their classrooms. Group A (N=12) was drawn from two of the Institute for Developmental Studies preschool classes and had two working telephones in their

classrooms which they were permitted to use each day. These children were also interviewed over the telephones in class by their teachers twice between the testing sessions.

Group B (N=13) was drawn from two other Institute classes. For the first half of the school year, these children had only toy telephones in their classrooms. The working phones were installed in February and the children in this group were interviewed informally by their teachers once between the second and third interviews. Both Groups A and B had almost a year of experience in the Institute's experimental enrichment program between the initial and final interviews.

Group C (N=8) consisted of a group of children from a Board of Education preschool class. These children had no experience using working telephones in their classrooms between interviews.

c) Data and Instrumentation

The interview consisted of ten general questions designed to demonstrate the child's orientation to place and time, recall of immediate and past events, labeling ability, imagination in descriptive use of language, and his ability to communicate. For example, the questions asked the child what he had been doing in school that day, where he would like to take a trip, to describe a specific object, and to tell a story about a series of pictures he is shown.

The children were taken from the classroom by the examiner to a separate room to be interviewed in order to eliminate background classroom noise from the tape recording. During the actual interview, the child sat in a small cardboard "booth" facing away from the interviewer. The two telephones were about 15 feet apart, and were like regular instruments except that they lacked a dial. The examiner's questions and probes, as well as the child's responses, were recorded directly from the telephone apparatus and later transcribed.

d) Language Analysis

A total of 88 interviews were coded. The interviews included: 36 from Group A, that is, three interviews with each of the 12 children in this group; similarly, 36 from Group B were coded (one subject was dropped from this group due to inaudibility of his recorded interviews); finally, 16 from Group C, that is, two interviews with each child were coded.

4. Preliminary Analysis

The data were first subjected to five major analyses: a) a traditional analysis, b) syntactical analysis, c) stylistic analysis, d) cognitive analysis, and e) articulation ratings. A brief explanation of each of these methods of analysis follows:

a) Traditional Language Analysis

The Traditional Language Analysis consists of the most

common and typical methods which have been used in language studies in the general literature, as well as methods developed by the Institute for Developmental Studies.

(1) Total Verbal Output (TVO)

This measure consits of two major categories: (a) the mean number of words for the first response to each question within a single interview, and (b) the mean number of words per question after probes have been given by the interviewer. This measure simply allows for the quantification of the number of words which the children in the sample produced in the interview situation.

(2) Type-Token Ratio (TTR)

This is a ratio of the number of different words spoken over the total number of words uttered by individual subjects. This yields a measure of the diversity of word knowledge.

(3) Parts of Speech Count (PSC)

Ratio: Number of correct verb forms/total number of verb forms.

Ratio: Number of correct possessives/total number of possessives.

Ratio: Number of correct plurals/total number of plurals.

Number of maze words per interview.

(4) Number of probes designed to obtain the correct telephone behavior from the child. For example, "Hold the receiver up to your ear." "Speak into the telephone."

(5) Quantitative Analysis of Interviewer-Child Interaction

Reaction time: the time (in seconds) of the pause following the asking of a question by the interviewer to the time of the child's response.

The mean length of the child's responses after the question has been asked, and the mean length of time divided by the total number of words in the response.

Over time, both of these measures can provide information concerning the increase in fluency, and ability of the child to respond more or less quickly to a question which is familiar to him, and to provide a more meaningful or relevant response.

b) Syntactical Analysis

The measures in Syntactical Analysis yield the general grammatical pattern of speech in the sample.

(1) Sentence structure (simple, compound, complex sentences, complete and incomplete sentences, including phrases and clauses).

(2) Verb forms (conjugation, subject-verb agreement, etc.)

(3) Grammatical error patterns (possessives, plurals, etc.)

c) Stylistic Analysis

Stylistic Analysis permits the evaluation of the general style of the children's speech, as well as accounting for individual differences in style relative to other measures in the analysis.

(1) The number and use of modifiers.

(2) The hesitation phenomenon.

(3) Voice quality (soft-loud, active-passive, amount of affect--speech as the communication of thoughts and feelings).

(4) Volume ratings (1-5 scale done on the basis of the volume control of a standard tape recorder).

d) Cognitive Analysis

Cognitive Analysis provides a measure of the cognitive elements in the children's responses. Each question in the interview was specifically designed to elicit some cognitive response from the child. For example, "What can you do with water?" The response to this question can be anywhere from a simple "Drink it" at the beginning of the school year, to "Sail boats in it" at the final interview.

(1) Appropriateness of Response:

Can the child code the proper information and give an appropriate response.

Appropriate response for the three sensory question. For example, does the child correctly report that the particular object he is asked to touch is hard or soft?

Appropriate response to factual variables in the interview. For example, correct naming of colors, particualrly within the story telling question.

Appropriate wording and general linguistic level of response to questions. For example, "When you shake it, how does it sound?" "It sounds like a bell." as opposed to simply "noisy." This is an indication of the level of the cognitive-linguistic ability of the child. The first would, of course, be considered a higher level response than the second.

(2) Communicative Effectiveness of Child's Speech.

This measure emphasizes the organizational qualities of the child's response. Although the entire interview is measuring this quality, particular emphasis for this category is placed on the child's response to the story-telling question. The story responses are coded for sequence, clarity, and general sense. Other coding for this heading includes classification of responses as: no response, no information given, irrelevant information given, and relevant information given.

e) Articulation and Speech Clarity

This category provides a very general index of the most frequently mispronounced words, and ratings of clarity and articulateness of speech on a 1-5 scale. From this measure, the most informative item will be the development of a list of those words most difficult for the subjects to pronounce.

5. Final Analysis

The intensive language analysis described above was completed on each of the 88 protocols. However, the process of translating spontaneous language data into reliable quantitative measures proved to be a difficult task. The children's responses in each interview were highly individual and often difficult to hear and understand, yet extensive probing would have destroyed the spontaneity of their speech. Thus, scoring required frequent revisions of, and additons to, the original

criteria. Also, certain of the analyses which were originally planned had to be dropped because the data did not permit their use in any fruitful way. In particular, the scoring of articulation and speech clarity, which was originally proposed, proved to be impracticable because of the difficulties involved in working with recorded speech. Similarly, certain data were omitted due to redundancy or difficulty in achieving reliable coding, and the interview was revised accordingly (see Appendix).

The method of scoring which proved feasible is described below. It utilizes a total of ten measures; I.Q. also was ascertained, by means of the Stanford-Binet Intelligence Scale.

Scoring of Language Samples

1. Mean Length of Response - Mean number of words elicited by three questions.

a) What did you do in school today?

b) If you could take a trip, where would you go?

c) What would you like to do next Saturday?

In each case, the score was the number of words given before the examiner's first probe to obtain more information. If the examiner received no immediate response and therefore had to repeat the question, the score was the number of words the child gave when and if he did respond after the question was repeated.

2. Color Knowledge - The child was shown and permitted to handle a different multi-colored toy object in each of the

interviews. In the first, it was felt, bean bag chicken; in the last, it was a metal duck on wheels. In each case the child was asked: "What colors do you see?" The score is the number of colors that the child named.

3. Knowledge of Material Use - In the first interview the child was asked: "What can you do with water?" and was probed with "What else can you do with water?" His score is the number of correct uses cited both before and after the probe. In the final interview he was asked: "What can you do with _____?"

a) water

b) paper

c) a hand

His score for the final interview is the mean number of correct uses cited.

4. Total Verbal Output (TVO) - The total number of words spoken by the child during the entire interview.

5. Type-Token Ratio - A ratio to two decimal places of the number of different words spoken by the child during the entire interview over the total number of words spoken.

6. Number of Objects in Story Pictures - A count of the number of objects and/or people identified by the child in the series of four pictures from a story book which he was shown. If an object appeared in more than one picture, the child received credit for each time he identified it. The question was: "What do you see in the picture?" Probes were: "What else do you see?" "What is happening?"

7. Number of Transitions in the Story Question - Refers to the transitions between pictures in the series of four. The child received credit for either implicit or explicit verbal transition. The maximum number of transitions that could be made is three. This variable was coded in the following manner:

0 = no transitions

1 = transition between two pictures

2 = transitions between three pictures

3 = transitions between four pictures.

8. Story Structure - A composite score of three separate indicators. For each of the two interviews, the response to each of the four pictures in the series was coded for a) any form of a modifier (adjective or adverb), b) the description of any instance of action of a person or animal (e.g., "The monkey ran." "The monkey ate the banana.") and c) any instance of interaction between two animals and/or people (e.g., "The man caught Curious George and tied him up." "The monkey liked the man.") The maximum score is 12, i.e., each of the three indicators present in each of the four pictures in a series.

9. Number of Repetitions of Questions - A count per interview of the number of original questions that the examiner had to repeat in order to elicit any response from the child. This does not include probes for additional information. No question was repeated more than once in its original form.

10. Number of Probes for Correct Telephone Behavior - a count of the number of probes that were given by the examiner in order

to elicit appropriate phone behavior from the child; e.g., "Talk louder." "I can't hear you." "You'll have to tell me with words because I can't see you." "Talk right into the telephone."

Statistical Treatment

The interviewing schedule was carried out as described in the "Procedure" section of this report. Unfortunately, a considerable segment of the interview data was lost in the process of the Institute's move to its present location. The interview schedule is diagrammed below; asterisks indicate data that were lost.

INTERVIEWING

Oct., 1964	Dec., 1964	Jan., 1965	June, 1965
GROUP A		GROUP A*	GROUP A
GROUP B		GROUP B*	GROUP B
	GROUP C*		GROUP C

Comparison of the first and second interviews of Group C, with no intervening telephone experience, or even of Group B, with only toy telephones available, would have provided a measure of test-retest reliability of the telephone interview technique. The loss of the first interview with Group C and the second with Group B made this impossible. However, the analyses performed do have a bearing on the question of reliability, and this question will be touched upon in the "Discussion" section of this report.

A Chi Square Test of the differences between the groups yielded no significant differences on any of the measures when

initial scores of Groups A and B were compared (initial interviews with Group C children were lost), or when final scores of all three groups were compared. The comparison presented in Figure I below is illustrative.

Figure I

Chi Square Test of Story Structure, final interview data on the two Experimental Groups (A and B) and the Control group (C).

	GROUP			
	A	B	C	
Score				Total
1	1	1	1	3
2	0	0	0	0
3	3	4	4	11
4	6	3	1	10
5	2	4	2	8
Total	12	12	8	32

df = 6, $\chi^2 = 1.70$, p = NS

Consistent with the Chi Square results, analysis of variance of the initial and final scores of the two experimental groups showed no significant differences due to experimental treatment on any of the measures.

In contrast, analysis of variance revealed significant ($p \leq .05$) differences between initial and final scores of the experimental groups, on seven of the ten language measures, and on Stanford-Binet IQ. Fiqure II below (based on Table 1-11 in Ap-

pendix) summarizes the findings for main effect of interview, by analysis of variance (repeated measures).

Figure II

Level of significance of Interview (Initial - Final) main effect on Stanford-Binet IQ and 10 language measures, assessed by analysis of variance for repeated measures.

	MEASURE	P
1)	Standford-Binet I.Q.	.05
2)	Total Verbal Output	.05
3)	Type-Token Ratio	.01
4)	Mean Length of Response	.05
5)	Color Knowledge	.01
6)	Knowledge of Material Use	NS
7)	Number of Repetitions of Questions	NS
8)	Number of Probes for Correct Telephone Behavior	.05
9)	Number of Objects in Story Pictures	.01
10)	Number of Transitions in the Story Question	NS
11)	Story Structure	.01

Mean pre-post difference on each of the measures was in the direction of improved performance. Therefore, it may be expected that those measures which did not show significant change in this study would do so with stronger intervention, or with a longer period between interviews.

6. Discussion and Conclusions

This study has been successful with respect to three of its four objectives. Specifically, the evidence of systematic changes in the direction of improvement over time (Figure II) offers strong support for the usefulness of the Telephone Interview in a longitudinal study (Objective b). Further, the type of change found could be expected only if the samples of speech obtained with the Telephone Interview, as revised, are reliable (Objective a), and the method of analysis has some validity (Objective c). Of course, the method of analysis was developed largely on the basis of the data obtained from the single sample of this study. It must be tested further on additional samples to assess the generality of its applicability.

With respect to the fourth objective of the study, to evaluate the effect of exposure to telephones in the preschool classroom upon the child's performance in the telephone interview, it is somewhat difficult to draw conclusions. No significant differences were found in any comparison of the three groups with each other, suggesting that those children exposed to the telephone apparatus were not strongly or specifically influenced by it. Even the measure perhaps most directly related to telephone use -- Number of Probes for Correct Telephone Behavior -- failed to elicit significant group differences. Two points should be made here.

First, the design of the study was not geared to maximize the potential effect of the telephone apparatus. Rather,

"exposure" to the telephone was essentially unstructured; the group with the greatest amount of exposure had only two teacher-directed uses of the apparatus between testings. Further, the difference in amount of exposure to the apparatus was not great. It would be helpful in future studies of the technique to increase the amount and vary the kinds of structured use of the apparatus, and also to record actual patterns of spontaneous telephone use by the children. It may be concluded tentatively that disadvantaged children will not make use of an available telephone apparatus in such a way as to make a very significant change in their spontaneous language, over the course of about eight months.

The second point that should be made is that the children of the three groups included in this study could be expected to be very similar to each other. In a previous study, analysis of telephone interview data by less refined measures than those used here did yield significant differences on a single testing between a group of children participating in the IDS enrichment program and a control group <u>without</u> pre-kindergarten experience. In the present study, as indicated, comparison of subject groups on initial scores yielded no significance differences. Further, the two programs in which the children were participating probably placed comparable stress on linquistic development.

The slightly differing patterns of speech development that were found in the groups over time in this study probably reflect classroom and curriculum emphases, rather than any single specific factor, such as exposure to the telephone.

APPENDIX

TELEPHONE INTERVIEW (PILOT STUDY)

1. Hello, _____. How are you today?

2. Where are you today?

   A. Tell me what you're doing.

   B. What else did you do today?

3. Do you have a television at home?

   A. What do you like to watch on television?

   B. What happened the last time you watched _____?

   C. What else happened?

4. Do you know what you want to be when you grow up?

   A. (If necessary) Tell me what you want to be.

   B. Why do you want to be a _____?

   C. What does a _____ do?

5. Do you see the box near you?

   A. Look inside the box and tell me what's in it.

   B. (Take it out of the box and tell me.)

   C. Tell me all the colors the clown has?

   D. Tell me what the clown is wearing.

   E. What is the clown made of?

   F. When you touch it, how does the clown feel?

   G. What do you think is inside the clown?

   H. When you shake it how does the clown sound? (If child says "like this", and gives no verbal explanation, E. says - "What's the word for that sound?")

   I. Do you think he is a happy clown or a sad clown?

   J. Tell me why the clown is so happy (sad)?

K. Would you like to give the clown a name? What would you like to call him? That's a very good name.

I asked you lots of questions didn't I? Now

6. Tell me what you would like to talk about?

(If NR, E says: Is there something you would like to ask me?)

A. Tell me about that.

B. That's very interesting. What else would you like to talk about?

STANDARD TELEPHONE INTERVIEW (PRESENT STUDY)

1. Hello, what's your name?

2. How are you today _____?

3. What did you do in school today?

4. If you could take a trip, where would you go? What would you you do at _____? Did you ever do that before?

5. What would you like to do next Saturday?

6. When you look in the mirror, what do you see? (This question will be asked while the child is actually looking at himself in a mirror which will be placed in the telephone booth.)

7. Children will be given an object to hold while the following questions are asked about it. (These objects will follow in a series from interview to interview: bird, cow, duck.)

    a. Tell me what you think that is.
    b. Tell me all the colors the _____ has.
    c. What is the _____ made of?
    d. When you touch it, how does it feel?
    e. What do you think is inside the _____?
    f. When you shake it, how does the _____ sound?
    g. Do you think he is a happy _____ or a sad _____?
    h. Tell me why you think he is happy (sad)?
    i. Would you like to give the _____ a name? What would you like to call him? That's a very good name.

8. Tell me_____, what can you do with _____? What else can you do with _____? (First interview: water; second interview: paper; third interview: a hand.)

9. For this question, the storybook of Curious George will be shown to the child at the same time that the interviewer is asking him questions. Only the first four pictures will be shown to the child and he will be asked to "tell me what is happening in this picture," etc. (Hopefully the children will be encouraged by this question to use a continuous language pattern. By following the sequence of pictures he can rely on the stimulus immediately before him, and not have to perform from memory.)

10. I asked you a lot of questions didn't I? Now, is there something you would like to ask me? Is there something you would like to tell me? (probes for this question, if the child responds at all----tell me about that, that's very interesting, anything else?)

It's been very nice talking to you _____, bye.

REVISED STANDARD TELEPHONE INTERVIEW

May, 1968

1. Hello, what's your name?

2. How are you today, _____?

3. What did you do in school today? (Probe: What did you play with? Tell me about that, What else did you do?)

4. If you could take a trip, where would you go? (Probes: What would you do there? Have you ever been there before? How do you get there? Who took you?)

5. The child will be given an object to hold while the following questions will be asked about it. (Object used in the first interview, bean-bag chicken; second interview, stuffed cow with a bell; third interview, quacking metal duck.)

    a. Tell me what you think that is.
    b. Tell me all the colors the _____ has.
    c. What is the _____ made of?
    d. When you touch it, how does it feel?
    e. What do you think is inside?
    f. When you shake it, how does the _____ sound?

6. What would you like to to next Saturday? (Probes: Did you do that before? How do you do that? Where would you do that?)

7. Tell me _____, what can you do with _____? (Probe: What else can you do with _____?) (First interview: water; second interview: paper; third interview: a hand.)

8. For this question, a four picture sequence from the storybook of Curious George will be shown to the child at the same time that the interviewer is asking him questions. He will be asked to "Tell me about what is happening in this picture." (Probes: What else is happening? What else do you see? What else is he doing?)

RATIONALE

FOR THE REVISED STANDARD TELEPHONE INTERVIEW

1 and 2) These first two questions serve no other function than to introduce the situation to the child and allow him to respond easily.

3) This question requires an open-ended response, allowing the child to draw on his immediate or recent observations of the classroom.

4) In the first place, this question tests the child's understanding of the concept "trip"; i.e. how far he can go, means of transportation, and places or people to visit on a trip. It also provides specific information about some places the child may have visited or would like to visit.

5) This question provides the child with a familiar object to see and hold, which he is asked to label and describe. For the most part he is not required to rely on memory. The responses can yield information on the child's ability to deal descriptively with what he perceives through the different sense modalities.

6) This question probes the child's understanding of the future and the possibility of his planning to do something. Also it provides information about the kinds of things a child would like to do and feels it possible for himself to do. It is also set at an aspiration level which does not seem unreasonable for the lower-class child.

7) This can provide us with some idea of the effect of the school curriculum upon the child. It may tap his understanding of certain applications, his vocabulary knowledge, and his use of imagination in extending the usage of common objects.

8) This question also provides the child with a concrete object to discuss. His responses will indicate whether he has any "story sense," can employ transitions ir linking related pictures, and imagination in elaborating on what is actually represented in the pictures.

GUIDELINES FOR USING TELEPHONES IN CLASSROOM

Lesson I - Pre-School and Kindergarten levels. (To be given a circletime lesson).

Lesson II - First-grade level.

A. Introduction to Phones

1. Showing a real phone and a toy phone, explain differences between them:

   a. The other speaker's voice cannot be heard on a toy phone.
   b. A real phone cannot be carried around.
   c. It is not necessary to see the other person when using a real phone.
   d. Two people must use real phones, whereas with a toy phone one person can pretend to carry on an imaginary conversation.

2. Explain how to use a real phone:

   a. Label the phone and its parts (dial, receiver, mouthpiece, etc.)
   b. Listen to what voice on the other end is saying.
   c. Respond with words and not gestures or nods.
   d. Hold receiver (demonstrate) and speak directly into mouthpiece
   e. Use dial only to "contact" other person and not while talking.
   f. A phone rings when someone is calling you and must be answered. This real phone, however, has a bell on the side which you must ring when you want to call someone to the other phone.
   g. Hold phone in position as long as conversation continues, do not rest phone in lap, etc.
   h. Stress that phone is a mechanical device and must be handled with care.

B. Introduction to booth (where applicable)

Show a picture of a real booth and show a toy booth pointing out the differences, i.e. a toy booth is more fragile and children must not sit or lean on it, but they must use the chair provided; the booth is only to be used when speaking on the phone and not to hide in, etc.

C. Initial exposure to phone

Allow each to have a turn speaking for a few minutes with the teachers: Have the assistant teacher assist at the phone with the child to see that he is using it properly. Have the children line up to say a few words over the phone (hello, how are you, goodbye) and then the teacher should instruct the child, over the phone, to pass the phone to the next child.

Lesson II - (Pre-School and Kindergarten levels to be given during circletime lessons)

Lesson I - Parts B and C First-Grade level

A. Brief review of Lesson I, i.e. phone parts and how to use phone.

B. Discussion of why people use the telephone, i.e. call store, call doctor, call to invite someone over, to report a fire, to tell people news, to call long distance (explain) to relatives, etc.

C. Based on the above discussion of uses of the telephone, teacher is to suggest that each child will have a turn to call her on the phone for a special reason. Tacher will then converse on the topic briefly with the child. The rest of the class may listen and then answer questions raised by the teacher as to the correctness of the child's use of the phone.

Lesson III - (to occur during work and play period or while children are working independently in the room)

The assistant teacher should call children individually to come and talk with the teacher on the telephone. The teacher should question the child about the activities he was engaged in that morning, i.e. something related to his immediate environment.

Useprobes that will encourage child to elaborate on his response rather than to be able to answer a simple "yes" or "no".

Lesson IV - (to occur during work and play period or while children are working independently in the room)

The assistant teacher should select children individually to call the teacher on the phone. The teacher will then ask the child what he would like to talk about. She should allow the child to structure the conversation as much as possible by leaving probes and comments open-ended, e.g. "Tell me more about them" - "What else happened?"

If the child fails to suggest a topic after some encouragement by the teacher, she should suggest a topic to the child in the following manner: "Tell me about the time we visited the fire house," attempting to let the child draw upon his own recollections as much as possible. In suggesting a topic, select one which is broad enough to permit a sequence of speech from the child, not just one word comments.

Lesson V (Use appropriate part of level of class)

A. Pre-school - During free play, call children to the phone individually. Have an object (to be designated) on the chair beside the phone. Question the child about what he sees:

What is it?
What does it look like?
What color is it?
What shape is it?
What size is it?
How big is it?
What does it sound like?
What is it made of?
What can you do with it?
What does it feel like?
Is it hard or soft?

B. Late pre-school and early kindergarten- During free play call children to the phone individually. Have a book (to be designated) on the chair beside the phone. Ask the child to open the book to the first page and then, turning one page at a time, tell the story to the teacher over the phone. Use neutral probes such as "Tell me more about that picture" and "And then what happens?" to encourage more speech from the child. Have the child proceed with the story as far as time will permit.

C. Late kindergarten and first grade - During a morning when the teacher has read a story to the class, call the children individually to the phone. Ask them to tell about the story that was read that day. Attempt to clicit the events of the story in sequence. Use neutral probes when necessary. Begin by saying: "You remember that story I read today. Tell me about it." If there is no response, say: You remember, it was about (brief description of story theme)... Now tell me what happened."

Lesson VI - (To occur during free play)

A. Pre-school and Kindergarten - The teacher should suggest to two children involved in the same type of activity to talk to one another on the phone about what they are doing. She should observe the children's conversation and, if needed, encourage the children (with very general probes) to discuss their activity.

A suggestion for a situation might be for a child playing in the doll corner to invite another child to come to a party. This lesson should provide the children with an understanding of the varied experiences they are able to discuss on the phone. A follow-up for this lesson would be a general discussion (during circle time or snack time) about what the children spoke about on the phone together.

Table 1

Analysis of variance of Stanford-Binet IQ Scores:
Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	6665.653	45		
Between Subjects	4997.653	22		
Treatment	11.113	1	11.113	<1
Sex	87.943	1	87.943	<1
Treatment X Sex	11.438	1	11.438	<1
Error	4887.159	19	257.219	
Within Subjects	1668.000	23		
Interview	415.626	1	415.626	6.931*
Treatment X Int	77.901	1	77.901	1.299
Sex X Int	6.707	1	6.707	<1
Treat X Sex X Int	48.380	1	48.380	<1
Error	1139.386	19	59.968	

*$F_{.95\ (1,19)} = 4.38$

Table 2

Analysis of variance of Mean Length of Response Scores: Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	7612.000	47		
Between Subjects	4683.000	23		
Treatment	37.976	1	37.976	< 1
Sex	217.906	1	217.906	< 1
Treatment X Sex	209.531	1	209.531	< 1
Error	4217.587	20	2108.793	
Within Subjects	2929.000	24		
Interview	527.885	1	527.885	4.883*
Treatment X Int	6.890	1	6.890	< 1
Sex X Int	210.001	1	210.001	1.943
Treat X Sex X Int	22.204	1	22.204	< 1
Error	2162.020	20	108.101	

*$F_{.95\ (1,20)} = 4.35$

Table 3

Analysis of variance of Color Knowledge Scores:
Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	105.250	47		
Between Subjects	47.250	23		
Treatment	.174	1	.174	<1
Sex	8.647	1	8.647	5.266*
Treatment X Sex	5.596	1	5.596	3.408
Error	32.833	20	1.642	
Within Subjects	58.000	24		
Interview	17.033	1	17.033	9.532**
Treatment X Int	.473	1	.473	<1
Sex X Int	.008	1	.008	<1
Treat X Sex X Int	4.748	1	4.748	2.657
Error	35.738	20	1.787	

*$F_{.95\ (1,20)} = 4.35$

**$F_{.99\ (1,20)} = 8.10$

Table 4

Analysis of variance of Knowledge of Material Use Scores: Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	3058.813	47		
Between Subjects	1742.313	23		
Treatment	6.016	1	6.016	<1
Sex	180.278	1	180.278	2.402
Treatment X Sex	54.865	1	54.865	<1
Error	1501.154	20	75.058	
Within Subjects	1316.500	24		
Interview	4.005	1	4.005	<1
Treatment X Int	131.364	1	131.364	2.334
Sex X Int	1.726	1	1.726	<1
Treat X Sex X Int	53.783	1	53.783	<1
Error	1125.622	20	56.281	

Table 5

Analysis of variance of Total Verbal Output Scores:
Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	280190.480	47		
Between Subjects	210657.980	23		
Treatment	242.499	1	242.499	<1
Sex	12466.300	1	12466.300	1.398
Treatment X Sex	19608.256	1	19608.256	2.199
Error	178340.925	20	8917.046	
Within Subjects	69532.500	24		
Interview	12177.200	1	12177.200	4.542*
Treatment X Int	94.894	1	94.894	<1
Sex X Int	128.748	1	128.748	<1
Treat X Sex X Int	3506.386	1	3506.386	1.308
Error	53625.272	20	2681.264	

*$F_{.95\ (1,20)} = 4.35$

Table 6

Analysis of variance of Type-Token Ratio Scores:
Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	1906.000	47		
Between Subjects	1031.000	23		
Treatment	97.465	1	97.465	2.366
Sex	2.181	1	2.181	<1
Treatment X Sex	107.414	1	107.414	2.607
Error	823.940	20	41.197	
Within Subjects	875.000	24		
Interview	253.070	1	253.070	10.031*
Treatment X Int	41.592	1	41.592	1.649
Sex X Int	9.056	1	9.056	<1
Treat X Sex X Int	66.730	1	66.730	2.645
Error	504.552	20	25.228	

*$F_{.99(1,20)} = 8.10$

Table 7

Analysis of variance of Number of Objects in Story Pictures Scores: Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	882.480	47		
Between Subjects	343.980	23		
Treatment	38.435	1	38.435	3.137
Sex	42.607	1	42.607	3.478
Treatment X Sex	17.922	1	17.922	1.463
Error	245.016	20	12.251	
Within Subjects	538.500	24		
Interview	335.932	1	335.932	37.334*
Treatment X Int	8.113	1	8.113	<1
Sex X Int	5.709	1	5.709	<1
Treat X Sex X Int	8.795	1	8.795	<1
Error	179.951	20	8.998	

*$F_{.99\ (1,20)} = 8.10$

Table 8

Analysis of variance of Number of Transitions in the Story Question Scores: Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	53.917	47		
Between Subjects	34.917	23		
Treatment	.318	1	.318	<1
Sex	7.935	1	7.935	6.016*
Treatment X Sex	.276	1	.276	<1
Error	26.388	20	1.319	
Within Subjects	19.000	24		
Interview	2.847	1	2.847	3.998
Treatment X Int	.363	1	.363	<1
Sex X Int	.439	1	.439	<1
Treat X Sex X Int	1.109	1	1.109	1.558
Error	14.242	20	.712	

*$F_{.95\ (1,20)} = 4.35$

Table 9

Analysis of variance of Story Structure Scores:
Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	160.000	47		
Between Subjects	73.000	23		
Treatment	1.071	1	1.071	<1
Sex	6.383	1	6.383	1.955
Treatment X Sex	5.016	1	5.016	1.536
Error	60.530	20	3.265	
Within Subjects	87.000	24		
Interview	23.942	1	23.942	9.024*
Treatment X Int	2.885	1	2.885	1.087
Sex X Int	.348	1	.348	<1
Treat X Sex X Int	6.765	1	6.765	2.550
Error	53.060	20	2.653	

*$F_{.99\ (1,20)} = 8.10$

Table 10

Analysis of variance of Number of Repetitions of Questions Scores: Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Score	SS	dfs	MS	F
Total	618.980	47		
Between Subjects	297.480	23		
Treatment	4.327	1	4.327	<1
Sex	41.433	1	41.433	3.611
Treatment X Sex	22.250	1	22.250	1.939
Error	229.470	20	11.474	
Within Subjects	321.500	24		
Interview	40.804	1	40.804	3.110
Treatment X Int	1.503	1	1.503	<1
Sex X Int	.008	1	.008	<1
Treat X Sex X Int	16.768	1	16.768	1.278
Error	262.417	20	13.121	

Table 11

Analysis of variance of Number of Probes for Correct Telephone Behavior Scores: Treatment (E_1 vs E_2) X Sex X Interview (Initial vs Final).

Source	SS	dfs	MS	F
Total	237.479	47		
Between Subjects	103.980	23		
Treatment	2.294	1	2.294	<1
Sex	5.641	1	5.641	1.208
Treatment X Sex	2.680	1	2.680	<1
Error	93.365	20	4.668	
Within Subjects	133.499	24		
Interview	16.635	1	16.635	4.456*
Treatment X Int	1.166	1	1.166	<1
Sex X Int	38.431	1	38.431	10.295*
Treat X Sex X Int	2.601	1	2.601	<1
Error	74.666	20	3.733	

*$F_{.95\ (1,20)} = 4.35$
**$F_{.99\ (1,20)} = 8.10$